Obituary

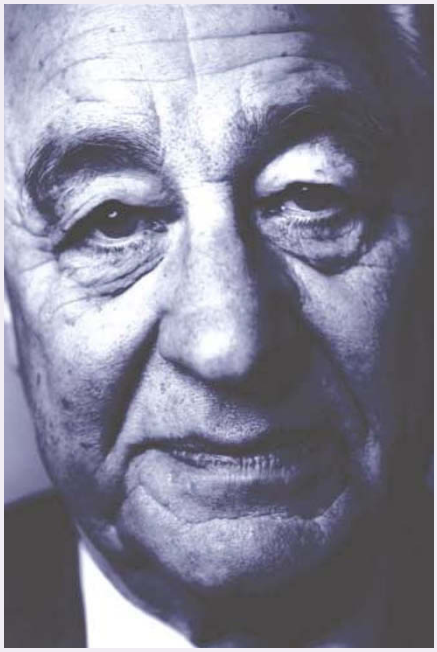
George Porter (1920–2002)

The time taken for molecules to dissociate or rearrange lies typically in the range 1–100 fs, a femtosecond being 10^{-15} s. When, in 1945, George Porter started out as a research student at the University of Cambridge, direct observation of these processes was impossible. But he lived to see the techniques that he developed reach the astonishing state today where such ultrafast events can be studied routinely in real time. Porter died on 31 August 2002, aged 81. He was scientifically active until the last two years of his life, a tribute to his devotion to his own and his colleagues' science, and to promoting science generally.

Porter, a Yorkshireman, displayed a passion for science as a schoolboy and obtained his BSc in chemistry at the University of Leeds. At Cambridge, with R. G. W. Norrish, he tackled the problem of how to detect short-lived chemical intermediates, so-called free radicals. These are molecules that have an unpaired electron, which makes them extremely chemically reactive, so that they exist for what was thought then to be a very short duration — typically milliseconds or less. Porter knew that free radicals could be produced easily by absorption of light. From his wartime experience with signalling lamps using intense pulses, he reasoned that if a radical were created by a pulse of light that was short in comparison to the radical's lifetime, the species could be detected absorbing light from either a second continuous light source or a second pulse of light delayed in time with respect to the first. These experiments were spectacularly successful. They led ultimately to Porter and Norrish's award of a share in the 1967 Nobel Prize in Chemistry, for their development of 'flash photolysis'.

Radicals are common intermediates in chemistry and biology, and so of great interest, but there are even shorter-lived chemical entities, such as electronically excited states. Porter turned flash photolysis to the task of observing intermediates such as 'triplet states' in the microsecond time-domain, and by 1960 this had become a standard approach. However, for conventional light sources, the shorter the pulse, the weaker the light. Nanosecond pulses can be made, but the intensity is too small — about as bright as a spark plug — to be useful.

In 1963, Porter had moved from Cambridge to the University of Sheffield,



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Innovator in ultrafast chemistry and advocate for pure research

where he was Firth professor of chemistry (he joked that with more funds, they would have appointed a 'Thecond' professor). Three years later, he and his group transferred to the Royal Institution in London — the RI. There they took advantage of Theodore Maiman's invention of the visible ruby laser, which could produce both short pulses and high intensities. Porter and colleagues exploited the laser technique, first in the nanosecond region, then quickly to picoseconds and, after 1985, at Imperial College London, ultimately to the femtosecond regime. He relished pointing out that within his lifetime the time-domain accessible to the 'ultrafast scientist' had shortened by about the same number of orders of magnitude as the timescale from the beginning of the Universe to the present day.

Few chemical reactions initiated by light are as important as photosynthesis, by which sunlight, carbon dioxide and water produce the carbohydrate food source that underpins all animal life on the planet. Porter's group helped to lay the foundations in understanding this vital process by investigating the photo-induced transfer of electrons in the first few picoseconds of the reactions. Inspired by this application of light in nature, he became increasingly interested in the artificial use of sunlight to provide energy, either directly as electricity, or by splitting water to produce hydrogen as a clean fuel.

As director of the RI, George Porter was inspirational. No one could forget the Davy–Faraday Laboratory weekly discussions — George sitting in the front row, quietly puffing on his pipe under the no-smoking sign, and listening to young students or distinguished visitors with equal courtesy, and through politely expressed questions cutting straight to the heart of the matter (often to the discomfort of the speaker). The RI was founded in 1799, and by 1966 could easily have been regarded as an anachronism. But in the 19 years they were in residence, Porter and his wife Stella made it a living centre for the exposition of science. They brought a memorable style and glamour to the public functions; Davy and Faraday would have approved of the preservation of top-class science and lucid scientific presentation.

Popularization of science was then widely sneered at, but Porter had the courage and vision to make it a major concern and changed the perception of such activities. He insisted that speakers at the RI discourses use demonstrations in the best traditions of the institution, and exemplified the style by being the most polished of presenters. His early films on thermodynamics still look remarkable. At the RI, he also introduced the Christmas Lectures to BBC television audiences. Uniquely, he simultaneously held the positions of president of the Royal Society, president of the British Association for the Advancement of Science, and director of the Royal Institution, and he was instrumental in the founding of COPUS — the Committee for the Public Understanding of Science.

George Porter was a powerful advocate of preserving a strong scientific base in Britain, saying "pure research was merely that research which has not yet been applied". He had the ear of senior politicians, and after his creation as Lord Porter of Luddenham in 1990 he vigorously promoted the cause of pure research in the House of Lords.

He will be badly missed by his colleagues and collaborators, who number hundreds, and by his family — particularly Stella, who supported him with a passion equal to his own for science.

David Phillips

David Phillips is in the Department of Physical Chemistry, Imperial College, Exhibition Road, London SW7 2AZ, UK.
e-mail: d.phillips@ic.ac.uk